

379 Topic Material Research

A novel method to quantify bone loss around Implants

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Objectives: The aim of the present study was to test the ability of a new method to quantify bone loss around implants. The new method contrasts with the use of peri-apical radiographs which can only assess interproximal marginal bone level.

Material and methods: A dedicated software program (QT 1.0.0.2 by Inspektor Research Systems BV Amsterdam, The Netherlands) was developed to quantify circumferentially bone levels from an implant reference point to where bone first radiographically contacts the implant. CT images in DiCom format with voxel size of $0.2 \times 0.2 \times 0.2\text{mm}^3$ from patients with one or more implants were used. For each set of DiCom images the center bottom and top of the implant of interest was located to store its (x,y,z)-position. A 3D-rotation was calculated by the software and horizontal (xy) bitmap planes perpendicular to the long axis of the implant were constructed. Each xy-bitmap showed a circular cross section in the center of the image. Four transversal bitmaps parallel to the long axis of the implant were constructed from each cross section. It is then possible to position a reference from where bone levels are calculated. Marginal bone levels (D) are set on the 4 transversal sections on each side of the implant resulting in 8 circumferential measurements.

Results: Measurement repeatability of D was 1.5mm.

Conclusions: QT seems to be a promising method for quantitative longitudinal measurement of circumferential bone loss around implants. Buccal and lingual measurements provide important information for evaluation of aesthetical parameters or biological complications.